

## CLAIMS

1. A plasma reactor system for very fast etching of silicon or epoxy resins, comprising:

a chamber containing a wafer-holding pedestal;

5 a vacuum pump connected to the chamber for exhausting gas from the chamber through a pressure regulation valve;

a showerhead electrode positioned substantially parallel to the pedestal and at a distance less than 6 mm from it for injecting gas into the volume between pedestal and showerhead;

10 means for providing gases containing fluorine and/or oxygen to the showerhead electrode;

an RF power source connected to the pedestal and/or to the showerhead electrode; and

means for controlling the pressure inside the chamber to a level greater than 1.5 Torr.

2. The reactor of Claim 1 wherein the ratio of the RF power provided between the showerhead electrode and the pedestal to the gas pressure is greater than 1 Watt per cubic centimeter to each Torr of gas pressure.

3. A process for very fast etching of silicon or epoxy resins, comprising the steps of:

placing a wafer on a pedestal in a chamber;

exhausting gas from the chamber through a pressure regulation valve;

5 introducing a gas containing fluorine and/or oxygen into chamber through a showerhead electrode which is positioned substantially parallel to and less than 6 mm from the pedestal;

applying RF power to the pedestal and/or the showerhead electrode; and

10 maintaining the pressure inside the chamber at a level greater than 1.5 Torr.

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4. The process of Claim 3 wherein the ratio of the RF power provided between the showerhead electrode and the pedestal to the gas pressure is greater than 1 Watt per cubic centimeter to each Torr of gas pressure.

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